(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 28 October 2004 (28.10,2004)

PCT

(10) International Publication Number WO 2004/093222 A1

(51) International Patent Classification⁷: H01M 4/86, 4/58, 4/64, 4/72, 4/80, 4/76, 4/70, 4/66, 4/68, C25B 11/12

(21) International Application Number:

PCT/US2004/010882

(22) International Filing Date: 7 April 2004 (07.04.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/461,212

7 April 2003 (07.04.2003) US

(71) Applicant (for all designated States except US): UNIVER-SITY OF HAWAII [US/US]; Office of Technology Transfer, and Economic Development, 2800 Woodlawn Drive, Suite 280, Honolulu, HI 96822 (US).

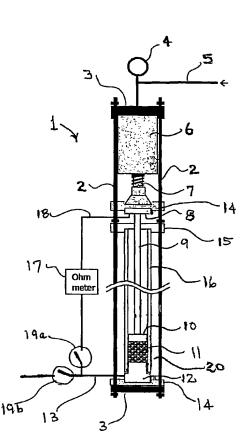
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): ANTAL, Michael, J.,

Jr. [US/US]; 358 Opihikao Place, Honolulu, HI 96825 (US).

- (74) Agent: SUYAT, Reginald, J.; Beyer Weaver & Thomas LLP, P.O. Box 778, Berkeley, CA 94704-0778 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: CARBONIZED CHARCOAL ELECTRODE



(57) Abstract: An apparatus (1) for use of carbonized charcoal powder as an electrode is provided. Charcoal is provided as a powder, carbonized, and placed in a container (16) by which compressive pressure is applied to the carbonized-charcoal powder via one or more sides of the container (16). As a result of the compressive pressure the packed-bed (11) of carbonized-charcoal powder manifests a resistivity of less than about 1 ohm-cm and is suitable for use as an electrode in a fuel cell, battery or electrolyzer. The apparatus is adapted with electrical contacts (8, 9, 10) to conduct electric flow to or from the electrode and adapted for communication of an electrolyte with the electrode.



WO 2004/093222 A1

WO 2004/093222 A1



Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

with international search report